

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

FORUM US, INC.

Plaintiff,

v.

ODESSA SEPARATOR, INC.

Defendant.

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CIVIL ACTION NO. 6:20-cv-00150-ADA

JURY TRIAL DEMANDED

DECLARATION OF JOHN BEARDEN, P.E. (RETIRED)

I, John Bearden, hereby declare as follows:

1) My name is John Bearden. I have been retained by counsel for Forum US, Inc. to consult and provide technical expertise with respect to issues of claim construction on U.S. Patents 9,441,435 (“the ‘435 patent”); 10,132,151 (“the ‘151 Patent”); 10,132,152 (“the ‘152 Patent”); and 10,584,571 (“the ‘571 Patent”) (collectively, “the Patents”). Specifically, I have been asked to provide my opinion as to how a person having ordinary skill in the art would understand the following claim terms and phrases from those patents:

- “[first / second] flow path between the upper opening and the lower opening in the body”
- “flow diverter”
- “at least one further vent in an upper half of the inner tubular”
- “relieve back pressure”
- “if fluid cannot flow”
- “the filter comprises one or more vents”

2) My opinions on these terms and phrases are discussed in detail below. I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called

upon to do so, I would testify competently thereto. I understand that willful false statements and the like are punishable by fine or imprisonment, or both.

3) I hold a Bachelor's of Science and Master's degree in Mechanical Engineering from Texas A&M University and am a registered Professional Engineer (Retired) in the State of Oklahoma. Before retiring in March 2015, I spent 42 years in engineering design, development, and application of artificial lift Electric Submersible Pump (ESP) and Progressive Cavity Pump (PCP) systems. I have a thorough understanding of fluid dynamics, especially the way fluid flows in downhole environments. My thorough understanding comes from my 42 years of experience with downhole tools as well as my educational background. You can find details of my experience in my CV attached as Appendix A.

4) I am a named inventor on a number of patents and have published over 15 technical papers, most of which relate to ESPs. A listing of my patents and technical papers are provided in my CV.

5) I am being compensated for my expert witness consulting at \$250 per hour. I will be compensated for deposition testimony and court time at \$400 per hour, and my travel time is compensated at \$125 per hour. In addition to compensation for my time, I am being reimbursed for reasonable expenses associated with my work. My compensation is not dependent on the outcome of this proceeding, or the content or specifics of any of my opinions, statements or testimony.

6) I have served as an expert witness in three other cases: *Legacy Separators LLC v. Halliburton Energy Services Inc.*, Case No. 4:14-cv-2018 (S.D. Tex. 2014); *Multilift Wellbore Technology Limited v ESP Completion Technologies, LLC*, Case No. 2:16-cv-01187 (S.D. Tex. 2016); *Forum US, Inc. v. Progevity Oilfield Systems, LLC*, Case No. 4:18-cv-4094 (S.D. Tex. 2018). I have given expert testimony at trial before in one case, the *Legacy Separators* case referenced above.

7) My opinions are based on my educational background and my substantial experience with ESPs and PCPs. I also base my opinions on the materials cited throughout this Declaration, including the Patents.

8) I reserve the right to consider additional information that I may not have reviewed yet because it was unavailable at the time I prepared this Declaration. This includes documents that Defendant produces in this litigation after I have written my declaration.

9) Although I rely on a number of legal principles in my declaration, I am not an attorney and I do not have a legal background. Counsel for Forum has provided me with the legal principles contained in this report. I have accepted those principles as binding and my opinions rely on those principles, which are explained below.

10) I understand that claim terms are construed from the perspective of a person of ordinary skill in the art after taking into consideration the teachings of the patent and prosecution history. The person of ordinary skill in the art (“POSITA”) is a hypothetical person that is presumed to have existed at the time of the invention that has the capability of understanding the scientific and engineering principles applicable to the pertinent claimed invention. On that basis, it is my opinion a POSITA would have at least a bachelor’s degree in petroleum or mechanical engineering or the like and at least 1 year of exposure to artificial lift systems and the dynamics of downhole fluid flow or, alternatively, they would have at least a high school diploma and 5 years of hands-on or design experience with artificial lift systems (e.g., ESP or PCP pumps) under the guidance of an engineer with experience with such systems. I meet the requirements of a person having ordinary skill in the art under either of these alternatives.

11) I have also been informed that a claim is “indefinite” if a POSITA would be unable to determine the scope of the claim with reasonable certainty, after having viewed the patent and prosecution history.

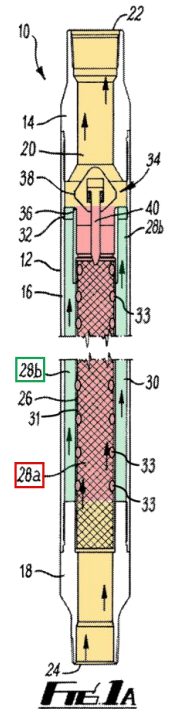
1. “first flow path between the upper opening and lower opening in the body” / “second flow path between the upper opening and lower opening in the body” (‘435 Patent, Cl. 1; ‘151 Patent, Cls. 1, 24)

12) I understand that Forum and OSI have proposed the following constructions for this phrase:

Forum	OSI
a [first/second] flow path between the upper opening and the lower opening in the body, where the [first/second] flow path is not required to extend from the upper opening to the lower opening but can instead reside at any point separating the upper and lower opening	[first] / [second] route through the body connecting the upper opening and the lower opening

13) It is my opinion that Forum’s proposed construction is the only one consistent with the teachings of the specification of the Patents and, therefore, a POSITA would interpret this phrase consistent with Forum’s proposal.

14) The Patents teach that the “inner tubular 26 divides the throughbore 20 into a first flow region 28a on the inside of the tubular and a second flow region 28b in an annular space 30 between the inner wall of the housing 16 and the inner tubular 26.” Ex. 2 [‘151 Patent] at 6:6-10.¹ I have annotated Figure 1A of the ‘151 Patent on the right to identify the first flow region 28a in **red**, the second flow region 28b in **green** and the lower and upper portions of the throughbore 20 in **yellow**. Importantly, the Patents also refer to element 28a as a “first flow path” and 28b as a “second flow



¹ For purposes of my Declaration, I have referenced the exhibit numbers associated with Forum’s Opening Claim Construction Brief.

path.” Ex. 1 [‘435 Patent] at Abstract (“First (28a) and second (28b) flow paths are provided....”); *Id.* at 10:11-16 (“first flow path 28a and the second flow path 28b”).

15) In addition to these teachings, the Patents do not refer to any portion of the tool above or below 28a and 28b as a “first flow path” or “second flow path.” Rather, element 28a is the only portion referred to as a “first flow path” and element 28b is the only portion referred to as a “second flow path.” In fact, a POSITA would understand that the Patents expressly teach that the second flow path does not extend to the lower opening. The Patents teach with respect to Figure 1 that “it should be noted that there is no direct flow path from the lower opening 24 to the second flow region which does not pass through the first flow region.” Ex. 2 at 6:32-34

16) In view of these unambiguous disclosures, a POSITA would understand the Patents to clearly teach that the first flow path 28a resides in the inner tubular 26 and the second flow path 28b resides in the annular space around the inner tube 26. A POSITA would also understand that neither the first flow path 28a nor the second flow path 28a connect the lower opening 24 to the upper opening 22 in any of the disclosed embodiments. Instead, the first flow path 28a and second flow path 28b reside in the space separating the lower opening 24 and upper opening. For these reasons, a POSITA would interpret this phrase as proposed by Forum.

2. “flow diverter” (All Patents)

17) I understand that OSI has proposed the following construction for “flow diverter.”

Forum	OSI
Plain and ordinary meaning	a valve or other mechanical device at the top of the first flow region that changes position to modify the flow paths through the body

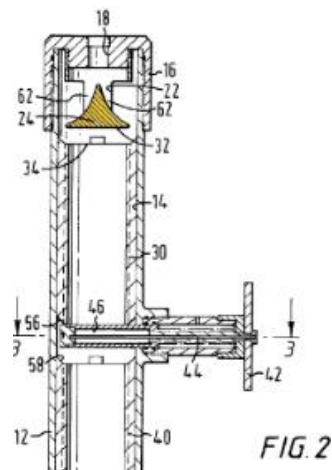
18) It is my opinion a POSITA would not interpret “flow diverter” as proposed by OSI. Instead, a POSITA would understand “flow diverter” to refer to a class of well-known and commonly used

mechanical² devices that divert flow, including diverter valves and fixed diverters without any moving parts that rely on their size, shape and/or placement to diverter flow.

19) The term “flow diverter” has been around the oil industry for a long time and is used in a variety of oilfield applications and contexts. In the context of downhole pumps and tubular operations a “flow diverter” refers to a physical, machined component that changes the direction of flow. While flow diverter valves, such as those illustrated in the figures of the Patents, are common, fixed flow diverters are common as well. A fixed flow diverter is a flow diverter that does not have moving parts, but instead relies solely on its designed size, shape, and/or placement in a downhole system to change the direction of flow. For example, a “Y junction” is a common type of fixed flow diverter, which is essentially a fixed pipe that splits flow into two separate paths. Examples of fixed flow diverters are clearly illustrated and described in the prior art, which a POSITA would have been well-aware of at the time of the inventions in the Patents.

20) U.S. Patent No. 6,056,053 discloses a fixed flow diverter with a downward sloping surface that diverts fluid flow, in reference to Figure 2.

Fluid, e.g. displacement fluid, is flowable through the bore 18 of the cap 16 to enter into a bore 22 of a **fluid diverter** 20. The fluid contacts a **diverter body** 24 which **directs the fluid away from the center of a top spool 30** and into spaces 26 between ribs 28 of the top spool 30 (see FIG.3) and the interior surface of the container. Ex. 13 at 7:55-65.



² A “mechanical” device refers to one that is a physical, machined component, as opposed to a chemical agent or a non-physical mechanism, such as centrifugal force.

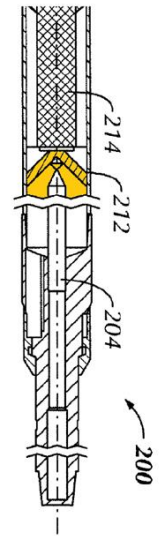
A POSITA would understand that the fluid diverter 20 has no moving parts, and instead relies on the size, shape and placement of its body 24 to redirect fluid away from the center of top spool 30.

A POSITA would understand that the flow diverter in the Patents could have been this type of fixed flow diverter, which would be placed on top of the inner tube 26 in Figure 1 and divert downward flowing fluid and solids into the second flow path or flow region 28*b*.

21) U.S. Patent Publication No. 2011/0024119 discloses a similar fixed flow diverter in reference to Figure 2:

Referring back to FIGS. 2A and 2B, the debris sub 202 is coupled to a lower end of the ported Sub 203 and houses a suction tube 204, a **flow diverter** 212, and the screen 214 Referring also to FIG. 5, the suction tube 204 is configured to receive a stream of fluid and debris from the wellbore and directs the stream through the **flow diverter** 212. Ex. 14 ¶ [0042].

As shown on the right, the flow diverter 212 is sized, shaped and placed to direct downward falling solid particles into the annular space around suction tube 204. Specifically, as solids and fluid flow up suction tube 214, the diverter 212 diverts



the solids off to the side so they can fall into the annular space around the tube 204. *Id.* ¶ [0042]

(“In this embodiment, the spiral flow diverter is configured to impart rotation to the fluid/debris stream as it enters a debris chamber from the suction tube 204. The rotation imparted to the fluid helps separate the fluid stream from the debris. The debris separated from the fluid stream drops down and is contained within the debris sub 202.”); *Id.* ¶ [0052] (“[T]he flow diverter 212 diverts

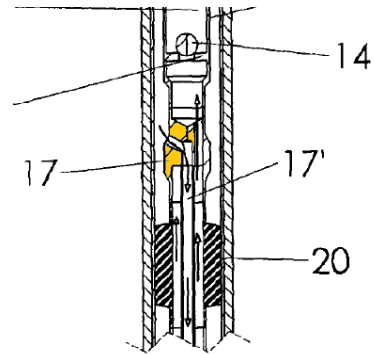
the fluid/debris mix from the suction tube 204 downward, as shown in more detail in Fig. 5. The flow diverter 212 is configured to provide rotation to the fluid stream as it is directed downwards.

The rotation provided to the fluid stream may help separate the debris from the fluid stream due to the centrifugal effect and the greater density of the debris. Thus, the flow diverter 212 separates larger pieces of debris from the fluid. The debris separated from the fluid streams drop downward

within the debris sub 202. After the fluid stream exits the diverter, it travels through the screen 214. The screen 214 is configured to remove additional debris entrained in the fluid stream.”). The fluid (and a small amount of solids) continues flowing upwardly through the diverter 212 into screen 214, where the remaining solids are filtered. *Id.*

22) U.S. Patent No. 8,997,870 discloses a fixed flow diverter similar to a Y-joint.

The annulus 6 is open to upward oil and gas flow to the surface and downward water flow to a water injection level indicated by arrows 16 via a **flow diverter** or by-pass 17 and a by-pass water flow conduit 17' for discharging water into a level of the geological formation at the bottom of the casing 2. Ex. 15 at 5:4-7.



As shown, the flow diverter 17 diverts a portion of the fluid flow through the annular space into the flow conduit 17', as indicate by the black arrow entering the left side of the through flow diverter 17 and flowing into the conduit 17'.

23) A POSITA would have recognized that these, and many other, fixed flow diverters fall within the scope and well-understood meaning of “flow diverter.” This is because the term “flow diverter” is a term commonly used in the oil and gas industry to refer to a broad class of physical, machined components that changes the direction of flow. It is my understanding that OSI’s proposed expert, Ray Foote, will testify that “flow diverter” can “mean many things in the oil and gas industry.” Ex. 16. I agree, and his expected testimony is consistent with my understanding as discussed above, including that “flow diverter” would be understood to include both fixed flow diverters with no moving parts, and the more commonly used flow diverter valves that have moving parts that change between an opened and closed state. The Patents teach that the use of a valve as a flow diverter is merely a preference, and so there is no reason a POSITA would exclude fixed flow diverters. Ex. 2 at 2:66.

3. “relieve back pressure” (‘152 Patent, Cls. 3, 22)

24) I understand that the parties have proposed the following construction for the phrase “relieve back pressure.”

Forum	Defendant
Plain and ordinary meaning	Indefinite
To the extent the Court believes a construction may aid the jury, “reduce pressure that restricts upward flow”	

25) A POSITA would not find this claim phrase indefinite, because a POSITA would be familiar with the concept of relieving back pressure, particularly when viewed in the context of the Patents. The specification teaches that solids collect in the second flow path 28*b*. Ex. 2 at 6:57-65. These collected solids will stack and plug at least some of the vents 33 in the inner tubular 26. *Id.* at 6:52-65. Figure 2 illustrates the solids collected in the bottom of the second flow path 28*b*.

26) When this blockage occurs, the amount of fluid that can flow through the tool 10 is reduced or restricted. The greater the restriction, the more back pressure builds up in the system. This increased back pressure is a result of the pump reducing its flowrate but increasing output pressure. In other words, the pump will push a reduced volume of fluid through less available flow space at a higher pressure.

27) By placing at least one vent in an upper section of the inner tubular 26, upward flow can still flow from the first flow path 28*a* to the second flow path 28*b* even when the vents beneath are plugged with solids. A POSITA would understand that placement of this additional vent relieves back pressure that would otherwise exist if the lower vents are blocked and no additional vent existed. In other words, this additional, upper vent helps lessen the restriction that would otherwise be present but for the existence of the upper vent. The Patents specifically discuss this concept of relieving back pressure. Ex. 2 at 5:3-7; *id.* at 5:22-24. This concept of “relieving backpressure” in

the Patents is entirely consistent with the concept generally. *See e.g.*, Ex. 22 at 1 (IAD Lexicon defining “backpressure” as “pressure resulting from restrictions to fluid flow downstream”); *id.* at 7 (Schlumberger Oilfield Glossary defining as “pressure within a system caused by fluid friction or an induced resistance to flow through the system”); *id.* at 9 (defining as “opposition to flow of a liquid or gas due to friction, inertia, gravity, or other cause”).

4. “if fluid cannot flow” (‘152 Patent, Cls. 2, 4, 21, 24, 27, 28; ‘571 Patent, Cls. 2, 4, 15, 17)

28) I understand that the parties have proposed the following construction for the phrase “if fluid cannot flow.”

Forum	Defendant
Plain and ordinary meaning	Indefinite

29) A POSITA would not find this claim phrase indefinite, because a POSITA would be understand that this claim phrase relates to the concept of relieving back pressure, as discussed above.

30) All claims with the phrase *if fluid cannot flow* impart similar limitations. Specifically, they require at least one opening/vent/passageway that is placed higher in the claimed tool than a previously recited opening(s)/vent(s)/passageway(s). This higher placed opening/vent/passageway allows upward flow to exit the opening in the top of the tool even if the flow cannot pass through a previously recited openings/vents/passageways due to blockage by solids.

Claim 4 of the ‘152 Patent provides one example of this:

The apparatus of claim 1, further comprising at least one opening in the flow diverter, wherein the at least one opening permits fluid flowing upwardly in the inner tubular to reach the upper opening in the body even *if fluid cannot flow* upward through the one or more vents in the wall of the inner tubular due to an accumulation of collected solid particles.

31) A POSITA would understand that claim 4 further requires the *flow diverter* from claim 1 to have at least one opening, which allows upward flow to reach the upper opening in the body

even if all of the inner tubular vents are blocked by sand. This opening in the flow diverter ensures that even if upward flow cannot pass from the inner tubular to the annular space because the vents are blocked by collected sand, the flow can still escape out the opening in the flow diverter and exit the tool. This helps relieve back pressure. This claim is consistent with the specification of the Patents, which discloses a flow diverter 34 with an opening to relieve back pressure. Ex. 2 at 7:1-3. Though a POSITA would also recognize that the claimed flow diverter could be a fixed flow diverter with an opening.

32) Claim 27 of the '152 Patent can also be used as an example to show that a POSITA would understand the scope of the claims with reasonable certainty:

The apparatus of claim 25, comprising at least one further vent in an upward section of a wall of the inner tubular, wherein the at least one further vent permits fluid flowing upwardly in the inner tubular to reach the upper production string tubing even *if fluid cannot flow* upward through the one or more vents in the lower part of the wall of the inner tubular due to an accumulation of collected solid particles.

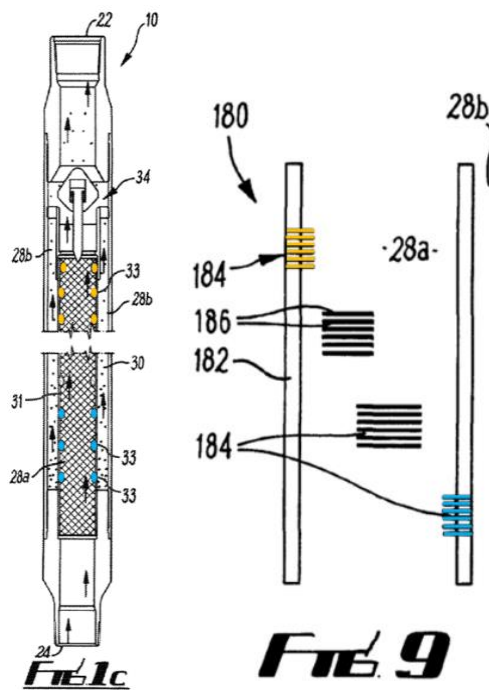
A POSITA would understand this claim further limits claim 25 by requiring an additional vent in an upper section of the inner tubular so that upward flow can still exit the tool even if the one or more vents in a lower part of the inner tubular are blocked by solid particles. This claim is consistent with the specification of the Patents, which discloses embodiments where the inner tubular has upper vents that provide back pressure relief. Ex. 2 at 9:42-52. In view of the above, a POSITA would understand the scope of “if fluid cannot flow” with reasonable certainty. It simply refers to the inability of fluid to flow through a vent/opening/passageway due to sand blockage.

5. at least one further vent in an upper half of the inner tubular ('152 Patent, Cl. 29)

33) I understand that the parties have proposed the following constructions for this phrase.

Forum	Defendant
Plain and ordinary meaning	Indefinite

34) A POSITA would have no difficulty ascertaining the meaning of this phrase with reasonable certainty. Claim 29 recites “one or more vents arranged between a lower half of a side wall of the inner tubular and a lower half of the annular space.” In reference to the embodiments of Figure 1A and Figure 9 (annotated below), a POSITA would understand that the “one or more vents” could include any of the vents 33 in a lower half of inner tubular 26 or the vent slots 186 in lower half of inner tubular 182.



35) Claim 29 also recites “at least one further vent in an upper half of the inner tubular.” A POSITA would understand that this could refer to any of the vents 33 in the upper half of the inner tubular 26 or the vent slots 186 in the upper half of the inner tubular 182. In view of the teachings

of the Patent and the context of claim 29, it is my opinion a POSITA would have no difficulty discerning the scope of this claim

36) I have been informed that it may be argued that the phrase that “further” connotes some sort of spatial relationship. However, a POSITA would understand that the term “further” simply means “additional.” The Patents routinely use the term “further” to mean “additional.” *See* Ex. 2 at 8:19-20 (“there is shown a *further* alternative embodiment of the invention”); 9:50-51 (“and in *further* alternatives, a wire mesh screen or filter may be provided over the slots”); 9:53 (“FIG. 10 shows a *further* alternative embodiment”). Other claims also use the term “further” to simply mean “additional;” none of the claims in any Patent uses the term to connote a spatial relationship. *See e.g., id.* at cl. 1 (“*further* configured to be installed above a downhole pump”), cl. 34 (“The method as claimed in claim 34, *further* comprising”); Ex. 3 at cl. 8 (“*further* assisting with carrying collected solids away”); Ex. 4 at cl. 50 (“the induced flow *further* causing collected solid particles”). For these reasons, a POSITA would not be confused by the term “further,” which simply means “additional.”

6. the filter comprises one or more vents (‘151 Patent, Cl. 25)

37) I understand that the parties have proposed the following constructions for this phrase.

Forum	Defendant
Plain and ordinary meaning	holes in a tubular wall having a wire mesh or screen over the holes on an outer surface of the wall. Alternatively, indefinite and/or lack of written description.

38) A POSITA would understand the scope of this phrase with reasonable certainty. The terms “vent” and “filter” are commonly used terms in the industry with well-known meanings. *See e.g.,* Ex. 23 at 2 (defining “vent” as “an opening for the escape of a gas or liquid or for the relief of pressure”); *id.* at 14 (defining “vent” as “an opening that allows air, gas or liquid to pass out of or

into a room, building, container, etc.”); Ex. 24 at 1 (defining “filter” as “any of several types of equipment or devices for removing solids from liquids or gases, or for removing particular types of light”); *id.* at 14 (defining “filter” as “a device that is used to remove something unwanted from a liquid or gas that passes through it”); *id.* at 17 (defining “filter” as “a porous article or mass (as of paper or sand) through which a gas or liquid is passed to separate matter in suspension”).

39) The Patents provide several examples of filters and vents. In reference to Figure 1, the specification teaches that the inner tube 26 may have vents 33 overlaid with a mesh or screen 31 that “functions to screen or filter solid particles such as sands from the fluid.” Ex. 2 at 6:57-58. Thus, in one embodiment a mesh or screen overlays the vents. The specification also teaches that a mesh or screen is not necessary, because vents “may be shaped and/or sized to limit the passage of sand and/or solid particles therethrough.” *Id.* at 3:31-33. For example, the specification provides an example of slots 184 that are “finely cut in the wall 182” of the inner tubular, thereby acting as a filter. *Id.* at 9:42-46. A POSITA would recognize that nothing in the specification precludes the use of only a mesh or screen between the [first / second] flow paths 28a and 28b, in which case the mesh or screen filters downward flowing solids and vents upward flowing fluid into the second flow path 28b.

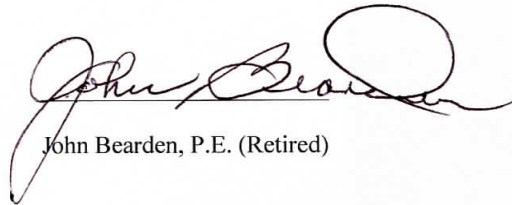
40) The phrase at issue is set forth in claim 25 of the ‘152 Patent, which depends from independent Claim 24. Claim 24 recites “a *filter* between a lower part of the second flow path and a lower part of the first flow path.” A POSITA would recognize that the “filter” in the independent claim could be, among other things: (1) a screen or mesh overlaying larger vents; (2) vents that are sized and/or shaped to filter; (3) the combination of both (1) and (2) (for improved filtering); or (4) only a screen or mesh between the first flow path and second flow path, in which case the screen both filters downward flowing solids from moving into the first flow path and vents upward flowing fluid into the second flow path.

41) Claim 25 recites “wherein *the filter comprises one or more vents* arranged between a lower part of the first flow path and the second flow path.” In other words, claim 25 further limits the “filter” to, for example, vents sized and/or shaped to filter (2 above) or only a screen or mesh that separates the first flow path from the second flow path (4 above).

42) In view of the above, a POSITA would be able to determine the scope of this claim with reasonable certainty.

43) I reserve the right to supplement this declaration if additional information that affects my opinions becomes available. In particular, I understand that discovery will be conducted in this case, and new evidence may be uncovered. I therefore may supplement or amend my opinions in response to new evidence uncovered by discovery or any expert report submitted. I also reserve the right to supplement or amend my opinion if either side in this action asserts any additional claims. I also understand that I may be asked at trial to express opinions regarding matters that are raised at trial.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on the 27th day of August 2020 in Pryor, Oklahoma.

A handwritten signature in black ink, appearing to read "John Bearden", with a large, stylized loop at the end of the name.

John Bearden, P.E. (Retired)